PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: JOHN McGUCKIAN

885,594

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International Classification:—F06l.

COMPLETE SPECIFICATION

Improvements in or relating to the Manufacture of Fluid-Conveying Hose

We, COMPOFLEX COMPANY LIMITED, a British Company, of 60, Huddersfield Road, Oldham, in the County of Lancaster, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with the manufacture of hose for conveying fluids, and particularly gaseous heating media such as coal gas or "bottled gas", the latter expression being intended to include any paraffin hydrocarbon or mixture of hydrocarbons stored in compressed form for industrial or domestic use.

Extruded plastic hose has hitherto been considered unsuitable for employment in the connection abovementioned, owing to the risk of its being melted by accidental contact with a hot surface; for example, that of a gas poker or other gas-heated appliance to which the hose is attached.

The object of the present invention is to provide an improved construction of plastic hose whose gas-tightness will not be impaired by any such accidental contact with a hot body, and which will have a high resistance to deformation through crushing or when sharply bent, as well as being adequately flexible.

According to this invention, the improved hose comprises an extruded plastic inner tube, an open-coiled wire helix snugly embracing the latter, and an outer tube formed of a non-inflammable plastic compatible with the material of the inner tube and overlying the wire helix.

If desired, the wire helix may be made shorter than the inner tube the exposed ends of which are united to the outer tube so that the wire is hermetically enclosed.

Corresponding ends of the two tubes, and the adjacent part of the enclosed wire helix, may be accommodated in an annular cavity in a metal end fitting which is subsequently deformed so as to grip the composite hose, or alternatively a plastic end fitting incorporating a threaded metal ferrule or insert may be homogeneously bonded to the hose.

In the accompanying drawings:—

Fig. 1 is a part-sectional side elevation of the improved hose showing the application of a metal end fitting thereto; and

Fig. 2 is a similar view showing the end fitting fixed in position;

Fig. 3 is a view corresponding to Fig. 2, but illustrating an alternative form of end fitting.

In the example illustrated in Figs. 1 and 2, the inner extruded tube A of the improved hose is formed of polyvinyl chloride either alone or admixed in any proportions with nitrile rubber, so as to be an easy sliding fit within a helix B of galvanised steel wire with a tensile strength of 60 to 100 tons, the pitch of such helix being dependent upon the internal dimension of the latter but usually not being much greater than the diameter of the wire used.

An outer tube C of polyvinyl chloride is then blown or extruded over the assembly above described, its end portions being bonded at D to those of the inner tube A whilst the remainder of it is separated from the latter by the turns of the wire helix B and the air between them.

Each end of the hose thus produced has attached thereto a tubular metal fitting E formed with an external screw-thread F (or alternatively an internal thread) as well as with an inner spigot portion G and an outer ferrule portion H which receive between them the mutually united parts of the plastic tubes

[*Pr*

P

A, C. The spigot and ferrule portions G, H are made long enough to overlap the endmost turns of the wire helix B when the hose is pushed home into the annular cavity K between them, the end fitting L (which has a non-circular enlargement for engagement by a spanner or the like) being secured in place by inwardly swaging the ferrule portion H at M so that it makes gas-tight engagement with the outer tube C.

Alternatively, as shown in Fig. 3, the end of the hose may have inserted therein a spigot O at one end of a tubular metal member P which is formed with a non-circular enlargement Q and a threaded portion R at the other end, a plastic ferrule S being then injection-moulded in contact with the exterior of the hose and keyed in position by means of circumferential ribs T on the member P.

Again, a pre-formed plastic fitting of similar shape and incorporating a threaded metal ferrule or insert may be united to the end of the hose by means of high-frequency welding.

It will be appreciated that, should a hot article come into contact with the plastic hose, or *vice versa*, the polyvinyl chloride outer tube C of such hose may melt but will not support combustion, the wire helix B serving to dissipate the applied heat so that the inner tube A, which is also insulated by the air between the wire turns, does not acquire a temperature sufficient to impair its gas-tightness.

Furthermore, the enclosed wire helix B, whilst affording the hose adequate flexibility, acts to corset the inner tube A so that the latter cannot kink in a manner to restrict the fluid flow therethrough when sharply bent, the close pitch of the wire turns and the high tensile strength of the wire used also providing a high resistance to crushing of the hose.

WHAT WE CLAIM IS:—

1. A hose comprising an extruded plastic inner tube, an open-coiled wire helix snugly embracing the latter, and an outer tube formed of a non-inflammable plastic compatible with the material of the inner tube, said outer tube overlying the wire helix.

2. A hose according to Claim 1, further characterised in that the inner and outer tubes are formed of polyvinyl chloride.

3. A hose according to Claim 2, further characterised in that the material of the inner tube contains a proportion of nitrile rubber.

4. A hose according to any one of Claims 1 to 3, further characterised in that the wire helix is made shorter than the inner tube, the exposed ends of which are united to the outer tube so that the wire is hermetically enclosed.

5. A hose according to any one of the preceding claims, further characterised in that corresponding ends of the two tubes, and the adjacent part of the enclosed wire helix are accommodated in a metal end fitting which is subsequently deformed so as to grip the composite hose.

6. A hose according to Claim 5, further characterised in that the end fitting is formed with an inner spigot portion for insertion into the interior of the hose and an integral ferrule portion adapted to be deformed as aforesaid upon the exterior of the hose, after the latter has been pushed into the annular cavity between them.

7. A hose according to any one of Claims 1 to 4, further characterised in that corresponding ends of the two tubes, and the adjacent part of the enclosed wire helix, are engaged between a spigot on a threaded metal insert in a plastic end fitting.

8. A hose according to Claim 7, further characterised in that the plastic end fitting is injection-moulded around the metal insert and the adjacent part of the hose.

9. A hose according to Claim 7, further characterised in that the plastic end fitting is pre-formed around the metal insert and homogeneously bonded to the hose after the latter has been engaged with a spigot portion of such insert.

10. A hose according to Claim 1 and used with or without an end fitting substantially as described with reference to, and as shown in Figs. 1 and 2, or Fig. 3 of the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to the Manufacture of Fluid-Conveying Hose

We, COMPOFLEX COMPANY LIMITED, a British Company, of 60, Huddersfield Road, Oldham, in the County of Lancaster, do hereby declare this invention to be described in the following statement:—

This invention is concerned with the manufacture of hose for conveying fluids, and particularly gaseous heating media such as coal gas or "bottled gas", the latter expression being intended to include any paraffin hydrocarbon or mixture of hydrocarbons stored in compressed form for industrial or domestic use.

Extruded plastic hose has hitherto been considered unsuitable for employment in the connection above-mentioned, owing to the risk of its being melted by accidental contact with a hot surface; for example, that of a gas

poker or other gas-heated appliance to which the hose is attached.

The object of the present invention is to provide an improved construction of plastic hose whose gas-tightness will not be impaired by any such accidental contact with a hot body, and which will have a high resistance to deformation through crushing or when sharply bent, as well as being adequately flexible.

According to this invention, the improved hose comprises an extruded plastic inner tube, a close-coiled wire helix snugly embracing the inner tube but terminating short of the ends thereof, and an outer tube formed of a non-inflammable plastic compatible with the material of the inner tube, said outer tube being united to the exposed ends of the latter and overlying the wire helix.

Corresponding ends of the two tubes, and the adjacent part of the enclosed wire helix, may be accommodated in an annular cavity in a metal end fitting which is subsequently deformed so as to grip the composite hose, or alternatively a plastic end fitting incorporating a threaded metal ferrule or insert may be homogeneously bonded to the hose.

In one example, the inner extruded tube of the improved hose is formed of polyvinyl chloride either alone or admixed in any proportions with nitrile rubber, so as to be an easy sliding fit within a helix of galvanized steel wire with a tensile strength of 60 to 100 tons, the pitch of such helix being dependent upon the internal dimension of the latter but usually being little greater than the diameter of the wire used.

An outer tube of polyvinyl chloride is then blown or extruded over the assembly above described, its end portions being bonded to those of the inner tube whilst the rest of it is separated from the latter by the turns of the helix and the air between them.

Each end of the hose has attached thereto a tubular metal fitting formed with an internal or external screw-thread, as well as with an inner spigot portion and an outer ferrule portion which receive between them the mutually united parts of the two plastic tubes. The spigot and ferrule portions aforesaid are made long enough to overlap the endmost turns of the wire helix when the hose is pushed home into the annular cavity between them, and thereafter the end fitting may be secured in place by inwardly swaging the ferrule portion thereof into gas-tight engagement with the outer tube.

Alternatively a pre-formed plastic fitting of similar shape and incorporating a threaded metal ferrule or insert may be united to each end of the hose by means of high-frequency welding, or a plastic end fitting may be injection-moulded in contact with the hose so as to incorporate a threaded metal member.

It will be appreciated that, should a hot article come into contact with the plastic hose, or *vice versa*, the polyvinyl-chloride outer tube of such hose may melt but will not support combustion, the wire helix serving to dissipate the applied heat so that the inner tube, which is also insulated by the air between the wire turns, does not acquire a temperature sufficient to impair its gas-tightness.

Furthermore the enclosed wire helix, whilst affording the hose adequate flexibility, acts to corset the inner tube so that the latter cannot kink in a manner to restrict the fluid flow therethrough when sharply bent, the close pitch of the wire turns and the high tensile strength of the wire used also providing a high resistance to crushing of the hose.

For the Applicants:
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57, Market Street, Manchester, 1.

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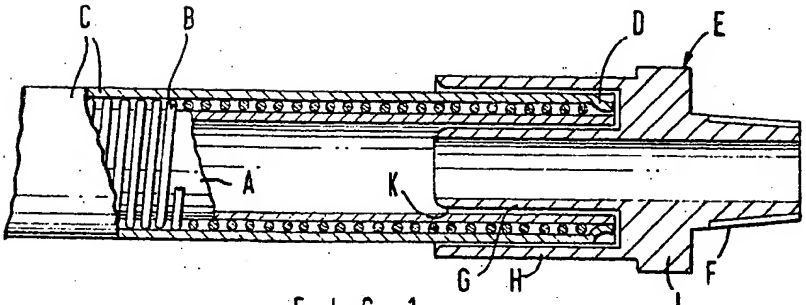
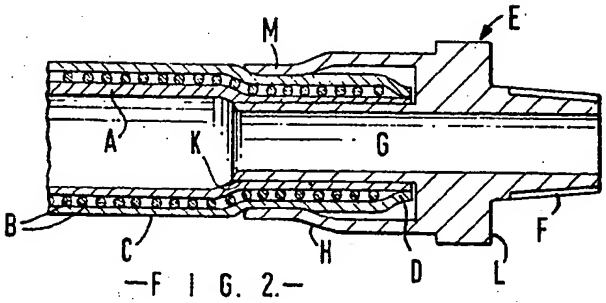
885,594 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale.



—F I G. 1.—



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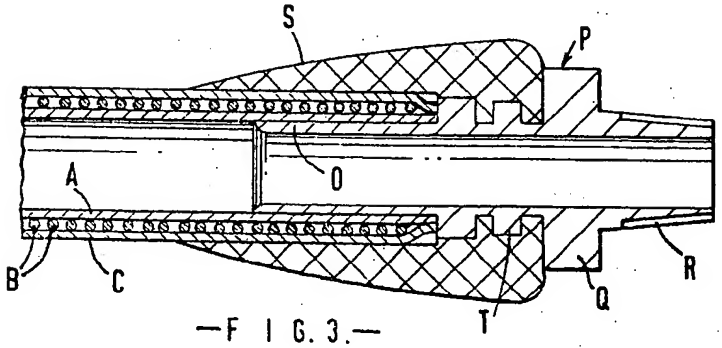

—F I G. 3.—